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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]

This invention relates to the multilayer-structure object for a package which has functional resin layers, such as a gas barrier resin layer, as an interlayer.

[0002]

[Description of the Prior Art]

The polyester resin represented by polyethylene terephthalate is excellent in the characteristics, such as a moldability, transparency, a mechanical strength, and chemical resistance.

Gas barrier property, such as oxygen, is also comparatively high, and, for this reason, is used in various fields as wrapping, such as a film, a sheet, and a bottle.

In order to improve the gas barrier property of the above wrapping, the wrapping which has a functional resin layer which consists of gas barrier materials, such as an ethylene-vinylacetate copolymer saponification thing and polyamide, as an interlayer between inside-and-outside layers is also proposed, but. Since such wrapping has the low adhesive strength of the resin (for example, polyester resin) which constitutes an inside-and-outside layer, and the engineering plastics which constitute an interlayer, there is a problem of being easy to produce interlaminar peeling.

[0003]

Therefore, in the multilayer-structure object for a package which provided the functional resin layer as an interlayer between inside-and-outside layers, generally, by providing a glue line between a functional resin layer and an inside-and-outside layer, adhesive strength is raised and controlling interlaminar peeling is performed.

For example, between a polyester resin layer (inside-and-outside layer), and an olefin and a vinyl acetate copolymer Ken ghost layer (functional resin layer), The layered product in which the graft denaturation ethylene and alpha-olefin random copolymer layer (adhesives layer) by which graft denaturation was carried out with unsaturated carboxylic acid or its derivative are provided is known (refer to patent documents 1).

[0004]

Mix gas-barrier-property resin to polyester resin, and the multilayered container in which the quantity of the particle of 10micro or less of polyester resin particles and a gas-barrier-property resin particle has a mixed resin layer which is 10% or less is proposed, and according to this multilayered container. It is indicated that layer indirect arrival nature can be raised without reducing transparency (patent documents 2).

[0005]

[Patent documents 1]

JP,62-158043,A (claim)

[Patent documents 2]

JP,8-25220,B

[0006]

[Problem(s) to be Solved by the Invention]

However, when providing a glue line between an inside-and-outside layer and a functional resin layer so that it may be represented by the above-mentioned patent documents 1, the extrusion machine for glue line formation will be needed, and increase of a production cost, etc. will be caused.

When each resin exists in the state of rough mixing in the mixed layer with which gas-barrier-property resin and polyester resin were mixed as indicated to the above-mentioned cited document 2, it is not effectively revealed and, moreover, the gas barrier performance which gas-barrier-property resin has comes to be inferior to the mechanical strength of a mixed layer.

[0007]

Therefore, the purpose of this invention is to provide the multilayer-structure object for a package whose adhesive property between layers improved, without providing an exceptional glue line between the interlayer who has functionality, such as gas barrier property, and an inside-and-outside layer.

Functions, such as gas barrier property, may be revealed efficiently, and other purposes of this invention are to provide the multilayer-structure object for a package excellent also in transparency.

[0008]

[Means for Solving the Problem]

According to this invention, from an inside-and-outside layer and an interlayer, it is formed at least and this interlayer, While consisting of the resin A which constitutes a sea section, and the engineering plastics B which constitute an island portion and having the sea island structure whose sea section is below 80 area %, a multilayer-structure object for a package, wherein an inside-and-outside layer is resin which has an adhesive property to the above-mentioned resin A is provided.

[0009]

In this invention,

1. Said island portion following formula (1) Reaches (2).

$$r = \frac{\sum_{i=1}^n r_i}{n} \quad \cdots (1)$$

$$Q = \frac{\sum_{i=1}^n Q_i \cdot \ln Q_i}{\sum_{i=1}^n \ln (1/n)} \quad \cdots (2)$$

However, r_i shows a diameter of a domain, n shows the number of domains, and diameter of domain r_i is.

It is $r_i = (a_i + b_i) / 2$ as minor-axis a_i of a domain, and major-axis b_i of a domain,

$$Q_i = \pi (r_i / 2)^2 / \left(\sum_{i=1}^n \pi (r_i / 2)^2 \right) \text{ をそれぞれ表す、}$$

Less than 3.5 micrometers and distribution parameter Q have the diameter r of an average domain larger than 0.68 come out of and expressed,

2. Said resin A is polyester,

3. Said engineering plastics B are gas-barrier-property resin,

4. Said interlayer has oxygen uptake ability,

5. Said engineering plastics B contain an oxidizing organic component and a catalyst,

6. Said engineering plastics B are what has high melt viscosity relatively to the resin A,

** -- it is desirable.

[0010]

While an interlayer consists of resin which forms an inside-and-outside layer, and the resin A and the engineering plastics B which have an adhesive property in this invention, It is the important feature to have the sea island decentralized structure which uses this resin A as a sea section, and uses the engineering plastics B as an island portion, and a sea section has become below in 80 area %, and thereby, it becomes possible to secure outstanding layer indirect arrival nature at the same time it fully reveals the characteristic of the engineering plastics B.

That is, with a multilayer-structure object for a package of this invention, since resin which forms an inside-and-outside layer, and the resin A which has an adhesive property exist in an interlayer as a sea section, this interlayer shows layer indirect arrival nature outstanding to an inside-and-outside layer. In such an interlayer, the engineering plastics B are distributing as an island portion, and moreover, since a sea section is restricted to below 80 area %, it is excellent also in functionality, such as gas barrier property which the engineering plastics B have.

For example, though resin which forms an inside-and-outside layer, and the resin A which has an adhesive property were used, when this resin A does not exist as a sea section, the layer indirect arrival nature of an inside-and-outside layer and an interlayer will fall. If a sea section in an interlayer whom this resin A forms increases more than 80 area %, the characteristics, such as gas barrier property which the engineering plastics B have, will stop being fully revealed.

[0011]

Distribution parameter Q which a diameter of an average domain (unextended portion) expressed with the above-mentioned formula (1) of an island portion which comprises the engineering plastics B in this invention is less than 3.5 micrometers, and is expressed with the above-mentioned formula (2) is larger than 0.68, That is, functions, such as gas barrier property which the engineering plastics B have when an island portion which comprises the engineering plastics B moreover exists in a sea section by narrow particle size distribution with comparatively small particle diameter, can fully be exhibited, and it becomes possible to have the outstanding transparency. This distribution parameter Q shows that a size of an island is so uniform that diameter of a domain of mono dispersion, i.e., Q, of an island portion is [one] near at the time of $Q = 1$.

[0012]

Drawing 2 so that clearly [it may be a figure showing relation between distribution parameter Q of a multilayer-structure object sheet of this invention, and Hayes (%) of a sheet which extended this multilayer-structure object sheet length and width, and 3 times x 3 times and] from this drawing 2, Hayes becomes small and it is understood that transparency is improving, so that distribution parameter Q which shows particle size distribution of an island portion is

[one] near. In the case of a multilayer-structure object for a package in which transparency is generally demanded, especially a bottle, so that clearly [as for Hayes, it may be desirable that it is 20% or less and] from drawing 3, It is clear that transparency distribution parameter Q may be satisfied with a multilayer-structure object of this invention of transparency by becoming Hayes smaller than 20% in the 0.68 neighborhoods is secured.

It is preferred that it is less than 3.5 micrometers in order that a diameter of an average domain of an island portion may fully demonstrate the characteristic of the engineering plastics B which constitute an island portion so that it may mention later, and it may raise a mechanical strength, When an island portion exists by a diameter of an average domain of less than 3.5 micrometers, and desirable particle size distribution narrow moreover at 3 micrometers, it becomes possible to have all, such as functions, such as transparency and gas barrier property, and a mechanical strength.

[0013]

[Embodiment of the Invention]

Drawing 1 shows the example of representation of the lamination in the multilayer-structure object for a package of this invention, the passage clear from this drawing 1 serves as 3 lamination by which the interlayer 2 was formed between the inner layer 1a and the outer layer 1b, and the glue line for pasting both up does not exist between the inside-and-outside layers 1a and 1b and the interlayer 2.

[0014]

[Inside-and-outside layers 1a and 1b]

In this invention, although the resin currently used for containers, such as a cup and a bottle, from the former can be used without restriction as resin which constitutes the inside-and-outside layers 1a and 1b, generally, olefine resin and polyester resin can be used in respect of a moldability, transparency, etc.

As olefine resin, low density polyethylene (LDPE), medium density polyethylene (MDPE), High density polyethylene (HDPE), linear low density polyethylene (LLDPE), Polyethylene, such as line ultra low density polyethylene (LVLDPE), and polypropylene, Ethylene propylene rubber, the polybutene 1, an ethylene-butene-1 copolymer, a propylene-butene-1 copolymer, an ethylene-propylene-butene-1 copolymer, an ethylene-vinylacetate copolymer, an ion bridge construction olefine copolymer (ionomer), etc. can be mentioned.

[0015]

Polyester resin is what is most suitably used in this invention, What can be crystallized so that especially biaxial stretching blow molding is possible is preferred, For example, mixed material, such as thermoplastic polyester, such as polyethylene terephthalate, polybutylene terephthalate, and polyethylenenaphthalate, these polyester and polycarbonate, and arylate resin, can be used. in this invention -- most ester repeating units (general -- more than 80 mol

%) The polyethylene terephthalate (PET) system polyester more than whose 80 mol % is an ethylene terephthalate unit, 50 thru/or 90 ** of whose glass transition points (Tg) are especially 55 thru/or 80 ** and 200 thru/or 275 ** of whose melting points (Tm) are especially 220 thru/or 270 ** is especially preferred.

[0016]

Although gay polyethylene terephthalate is the optimal as PET system polyester, the copolymerized polyester which has the content of an ethylene terephthalate unit in a mentioned range can also be used conveniently.

In this copolymerized polyester, as dibasic acid other than terephthalic acid, Alicycle fellows dicarboxylic acid, such as aromatic-dicarboxylic-acid; cyclohexanedicarboxylic acid, such as isophthalic acid, phthalic acid, and naphthalene dicarboxylic acid; Succinic acid, One sort or two sorts or more of combination, such as aliphatic-dicarboxylic-acid [, such as adipic acid, sebacic acid, and dodecane dione acid,],, can be illustrated, As diol components other than ethylene glycol, one sort, such as an ethyleneoxide addition of propylene glycol, 1,4-butanediol, a diethylene glycol, 1,6-hexylene glycol, cyclohexane dimethanol, and bisphenol A, or two sorts or more are mentioned.

[0017]

Especially in the polyester which should have a molecular weight which is sufficient for the ability of a film to be formed at least, for example, was mentioned above, the resin which constitutes the inside-and-outside layers 1a and 1b is good for 0.6 thru/or 1.40 dl/g of the intrinsic viscosity (I. V) to be in the range of 0.63 thru/or 1.30 dl/g.

Of course, it is also possible to form with the polyester which the inner layer 1a and the outer layer 1b do not need to be formed by resin of the same kind, for example, mentioned the outer layer 1b above, and to form with engineering plastics, such as gas barrier resin which mentions the inner layer 1a later.

Into the inside-and-outside layer 1a and 1b, lubricant, a modifier, paints, an ultraviolet ray absorbent, etc. may be blended by necessity.

[0018]

[Interlayer 2]

The interlayer 2 has a gas cutoff function at least, he uses the resin A as a sea section (namely, matrix), and the passage clear from drawing 1 has a sea island decentralized structure which uses the engineering plastics B as an island portion.

[0019]

[Engineering plastics B]

As the engineering plastics B, gas-barrier-property resin can be used, for example.

The typical thing of gas-barrier-property resin is an ethylene-vinylalcohol copolymer, For example, the copolymer saponification thing produced for an ethylene content by saponifying

so that the degree of saponification may become more than 99 mol % especially not less than 96% 20 thru/or 60-mol% about 25 thru/or 50-mol the ethylene-vinylacetate copolymer which is % is preferred. This ethylene-vinylalcohol copolymer (ethylene-vinylacetate copolymer saponification thing), It should have a molecular weight which is sufficient for the ability of a film to be formed, and it is desirable for the weight ratio of phenol/water to measure at 30 **, and to have 0.01 or more dl/g of especially intrinsic viscosity of 0.05 or more dl/g among 85/15 of mixed solvents, generally.

[0020]

As an example of gas-barrier-property resin other than an ethylene-vinylalcohol copolymer, For example, the polyamide of nylon 6, Nylon 66, and 6-nylon 6/6 copolymer, meta-KISHIRI range adipamide (MXD6), Nylon 610, Nylon 11, Nylon 12, and nylon 13 grade can be mentioned. Also in such polyamide, what has especially the 5 thru/or 50 number of the amide groups per 100 carbon numbers in 6 thru/or 20 ranges is preferred.

It is desirable for the relative viscosity which should have a molecular weight which is sufficient for such polyamide forming a film, for example, was measured at 30 ** among concentrated sulfuric acid (concentration of 1.0 g/dl) to be 1.5 especially or more 1.1 or more.

It becomes possible to use with the transition metal catalyst mentioned later, to give oxygen uptake ability to the engineering plastics B, i.e., an interlayer, and to perform absorption prehension of oxygen also in these, since meta-KISHIRI range adipamide of less than 40 meq/kg excels [amount / of terminal amino groups] in oxidation function nature.

[0021]

In order to give oxygen uptake nature to the gas-barrier-property resin used as the engineering plastics B mentioned above (i.e., in order to give an interlayer oxygen uptake ability), an oxidizing organic component and a transition metal catalyst (oxidation catalyst) can also be blended with an interlayer. That is, by oxidizing an oxidizing organic component, absorption prehension of the oxygen is carried out, the oxygen barrier function of gas-barrier-property resin is improved, and a transition metal catalyst is blended in order to promote oxidation of an oxidizing polymer. These oxidizing organic components and transition metal catalysts are also distributed by island shape with the engineering plastics B.

In this case, since absorption prehension of oxygen is performed by an oxidation organic component and the transition metal catalyst, The oxidation degradation of gas-barrier-property resin is prevented, they are prevented by exfoliation between layers, the fall of gas barrier property, etc., and as this suitable example, It is mentioned that the amount of terminal amino groups considers it as the engineering plastics B using meta-KISHIRI range adipamide, and the oxidizing organic component and transition metal catalyst of 40 or more meq/kg.

[0022]

As an oxidizing organic component blended with gas barrier resin, an ethylene system

unsaturation group content polymer can be mentioned. That is, this polymer has a carbon-carbon double bond, this double bond portion oxidizes easily by oxygen, and, thereby, absorption prehension of oxygen is performed.

[0023]

Such an ethylene system unsaturation group content polymer is derived considering polyene as a monomer, for example. Although not limited to this, as a suitable example of polyene Butadiene, Conjugated dienes, such as isoprene; 1,4-hexadiene, 3-methyl-1,4-hexadiene, 4-methyl-1,4-hexadiene, 5-methyl-1,4-hexadiene, Chain nonconjugated diene, such as 4,5-dimethyl- 1,4-hexadiene and 7-methyl-1,6-octadien; Methyl tetrahydro indene, 5-ethylidene-2-norbornene, 5-methylene-2-norbornene, 5-isopropylidene-2-norbornene, 5-vinylidene-2-norbornene, Annular nonconjugated diene;2,3-diisopropylidene- 5-norbornene, such as 6-chloromethyl 5-isopropenyl-2-norbornene and a dicyclopentadiene, Trien, such as 2-ethylidene-3-isopropylidene-5-norbornene and 2-propenyl-2,2-norbornadiene, chloroprene, etc. can be mentioned.

[0024]

That is, the homopolymer of the above-mentioned polyene or the random copolymer which combines two or more sorts of above-mentioned polyenes, or is combined with other monomers, a block copolymer, etc. can be used as an oxidizing polymer. As other monomers which carry out copolymerization to the above-mentioned polyene, A carbon number The alpha olefin of 2 thru/or 20, for example, ethylene, propylene, 1-butene, 4-methyl-1-pentene, 1-hexene, 1-heptene, 1-octene, 1-nonene, 1-decene, 1-undecene, 1-dodecen, 1-tridecenoic, 1-tetra decene, 1-pentadecene, 1-hexa decene, 1-heptadecene, 1-nonadecen, 1-eicosen, 9-methyl-1-decene, 11-methyl-1-dodecen, 12-ethyl-1-tetra decene, etc. can be illustrated, and styrene, vinyltrien, acrylonitrile, a methacrylonitrile, vinyl acetate, methyl methacrylate, ethyl acrylate, etc. can also be used besides these.

[0025]

Also in the polymer derived from the polyene mentioned above in this invention, Although polybutadiene (BR), polyisoprene (IR), crude rubber, nitril butadiene rubber (NBR), a styrene butadiene rubber (SBR), chloroprene rubber, ethylene propylene diene rubber (EPDM), etc. are preferred, of course, it is not limited to these. As for especially the iodine value, it is [100 or more] good that it is 120 to about 196.

[0026]

The polymer which oxidizes easily in itself besides the ethylene system unsaturation group content polymer mentioned above, for example, polypropylene, an ethylene oxidation carbon copolymer, etc. can be used as an oxidizing organic component.

[0027]

In this invention, it is preferred for the viscosity in 40 ** of the oxidizing polymer mentioned

above from standpoints, such as a moldability, or its copolymer that it is in the range of 1 thru/or 200 Pa-s.

As for especially the oxidizing organic component that consists of these oxidizing polymer or its copolymer, it is preferred per oxygen-barrier-property resin 100 weight section to use it in the quantity of 2 thru/or 10 weight sections 1 thru/or 15 weight sections.

[0028]

Although periodic table metals of the 8th group, such as iron, cobalt, and nickel, are preferred as a transition metal in the transition metal catalyst used with the oxidizing organic component mentioned above, Otherwise, they may be metals of the 7th group, such as metals of the 6th group, such as the Vth group metal, such as metals of the 4th group, such as the Ith group metal, such as copper and silver, tin, titanium, and a zirconium, and vanadium, and chromium, and manganese, etc. Also in these, especially cobalt promotes remarkably oxygen uptake nature (oxidation of an oxidizing organic component), and fits especially the purpose of this invention.

[0029]

Generally a transition metal catalyst is used in the form of the mineral salt of a low valence of the above-mentioned transition metal, organic salt, or complex salt.

As mineral salt, Lynn oxy salts, such as an oxy acid salt of nitrogen, such as oxy salts of sulfur, such as halide, such as a chloride, and sulfate, and a nitrate, and an phosphate, a silicate, etc. are mentioned.

As organic salt, although carboxylate, a sulfonate, phosphonate, etc. are mentioned, carboxylate is suitable for the purpose of this invention. As the example, acetic acid, propionic acid, isopropionic acid, butanoic acid, Isobutane acid, pentanoic acid, hexanoic acid, heptanoic acid, isoheptanoic acid, Octanoic acid, 2-ethylhexanoic acid, nonanoic acid, 3,5,5-trimethylhexanoate, Decanoic acid, neo decanoic acid, undecanoic acid, lauric acid, myristic acid, Transition metal salt, such as pulmitic acid, margarine acid, stearic acid, arachin acid, Linder acid, tsuzuic acid, a petroselinic acid, oleic acid, linolic acid, linolenic acid, arachidonic acid, formic acid, oxalic acid, sulfamic acid, and naphthenic acid, can be mentioned.

[0030]

As a complex of a transition metal, a complex with beta-diketone or beta-keto acid ester is mentioned. As beta-diketone or beta-keto acid ester, For example, an acetylacetone, ethyl acetoacetate, 1,3-cyclohexa dione, Methylenebis 1,3-cyclohexa dione, 2-benzyl-1,3-cyclohexa dione, Acetyl tetralone, palmitoyl tetralone, stearoyl tetralone, Benzoyl tetralone, 2-acetylcyclohexanone, 2-benzoylcyclohexanone, 2-acetyl-1,3-cyclohexa dione, benzoyl-p-KURORU benzoylmethane, Bis(4-methylbenzoyl)methane, bis(2-hydroxybenzoyl)methane, A benzoylacetone, TORIBENZO yl methane, diacetylbenzoylmethane, Stearoyl benzoylmethane, palmitoyl benzoylmethane, lauroyl benzoylmethane, Dibenzoylmethane, bis(4-KURORU

benzoyl)methane, a benzoylacetyl phenylmethane, Stearoyl (4-methoxy benzoyl) methane, butanolyacetone, JISUTE aroyl methane, stearoyl acetone, bis(cyclohexa noil)methane, dipivaloyl methane, etc. can be used.

[0031]

In this invention, especially the above-mentioned transition metal catalyst is good to blend 10 thru/or 1000 ppm in the quantity of 50 thru/or 500 ppm with the amount of metal conversion per gas-barrier-property resin.

[0032]

In this invention, the oxidizing organic component mentioned above has a function which carries out the trap of the oxygen by being easy to oxidize in itself and oxidizing. Therefore, such an oxidizing organic component can also be used as the engineering plastics B with a catalyst. When the inside-and-outside layers 1a and 1b are especially formed with polyester, such as polyethylene terephthalate, Since the inside-and-outside layer 1a and the 1b itself have comparatively high oxygen barrier property, oxygen interception nature high enough is securable by using an oxidizing organic component as the engineering plastics B with a catalyst.

[0033]

As a method of blending an oxidizing organic component and a transition metal catalyst (oxidation catalyst), using gas-barrier-property resin as an interlayer's engineering plastics B mentioned above, After considering it as a strand shape resin composition and making this strand shape resin composition into a pellet type, deaerating the above-mentioned gas-barrier-property resin, an oxidizing organic component, and a transition metal catalyst using a twin screw extruder, a dry blend is carried out to the resin A, the hopper of the extrusion machine for interlayers is supplied, and it is considered as an interlayer. The above-mentioned engineering plastics B and the resin A can be beforehand kneaded and pelletized with a twin screw extruder, this pellet can be supplied to the hopper of the extrusion machine for interlayers, and it can also be considered as an interlayer.

In this case, although gas-barrier-property resin (engineering plastics B) containing an oxidizing organic component and a transition metal catalyst is distributed by the resin A, a part of above-mentioned oxidizing organic component and/or transition metal catalyst may be distributed by the resin A.

Gas-barrier-property resin, oxidizing organic component, and transition metal catalyst (oxidation catalyst) of the engineering plastics B are directly blended to the resin A, it is good also as an interlayer and gas-barrier-property resin (engineering plastics B), an oxidizing organic component, and a transition metal catalyst are distributed in the resin A in this case, respectively.

[0034]

[Resin A]

In this invention, what has an adhesive property to the resin which constitutes the inner layer 1a or the outer layer 1b as the resin A (it is hereafter called matrix resin) which constitutes the interlayer's 2 sea section is used.

namely, carboxylic acid, such as what is used as adhesive resin for adhesives stratification from the former, for example, maleic acid, itaconic acid, and fumaric acid, -- or, The graft denaturation olefine resin etc. in which graft denaturation was carried out by the anhydride of these carboxylic acid, amide, ester, etc. can be used as matrix resin A. In such graft denaturation olefine resin, polyethylene, polypropylene, an ethylene-alpha olefin copolymer, etc. are preferred as olefine resin which should carry out graft denaturation. An ethylene-acrylic acid copolymer, an ion bridge construction olefin system copolymer, an ethylene-vinylacetate copolymer, copolymerized polyester, copolymerization polyamide, etc. can be used as adhesive resin, for example besides such graft denaturation olefine resin.

It is preferred in a standpoint adhesive in these adhesive resin to a carbonyl group ($>C=O$) 1 thru/or 100 meq(s)/100g resin and to contain in the quantity of 10 thru/or 100 meq(s)/100g resin especially to a main chain or a side chain.

[0035]

In this invention, the resin which forms the inner layer 1a or the outer layer 1b can also be used as matrix resin A. That is, it is because such resin naturally has the high compatibility over the inside-and-outside layers 1a and 1b and a good adhesive property is shown. For example, when the inside-and-outside layers 1a and 1b are formed with polyester, polyester can be used as the resin A. When using the resin which forms such inside-and-outside layers 1a and 1b as matrix resin A, the multilayer-structure object for a package can be manufactured with few kinds of resin material, and it is very advantageous in respect of simplification of a production process, the reduction of a production cost, etc.

[0036]

[Sea island decentralized structure]

In the multilayer-structure object for a package of this invention, the interlayer 2 uses matrix resin A as a sea section, and has a sea island decentralized structure which uses the engineering plastics B as an island portion as already stated. According to such a sea island decentralized structure, without providing an exceptional adhesives layer, the layer indirect arrival nature of the interlayer 2 and the inside-and-outside layers 1a and 1b can be raised, and functionality, such as oxygen barrier property, can fully be demonstrated simultaneously. That is, since matrix resin A which constitutes a sea section has an adhesive property to the inside-and-outside layers 1a and 1b, the layer indirect arrival nature of the interlayer 2 and the inside-and-outside layers 1a and 1b is improved. Functionality, such as gas barrier property which this resin B has with the engineering plastics B currently distributed to island shape, is

demonstrated. Since the engineering plastics B which the engineering plastics B especially distribute to island shape by this invention, and are distributed to island shape are independently confined into matrix resin A, respectively, the fall of the gas barrier property by moisture is also avoided effectively, and the characteristic stable over the long period of time is demonstrated, for example.

[0037]

It depends for the phase structure of the two-ingredient mixed material which comprises matrix resin A and the engineering plastics B on process conditions, such as melt viscosity, a presentation and screw shape, number of rotations, and temperature. Especially important things are melt viscosity and a presentation in these.

In order to make the above sea island decentralized structures form in melt viscosity first, it is preferred to combine matrix resin A and the engineering plastics B so that the engineering plastics B may have high melt viscosity relatively to matrix resin A. That is, in order to form the interlayer 2 who mentioned above, melting mixing of matrix resin A and the engineering plastics B is carried out in an extrusion machine, but it is because the higher one of melt viscosity forms an island portion and the lower one of melt viscosity becomes easy to form a sea section in this case. Therefore, as for the engineering plastics B, in this invention, it is preferred to have melt viscosity higher than matrix resin A.

[0038]

On the occasion of the above melting mixing, there is a tendency for a lot of ingredients to turn into a sea section, and for a little ingredients to turn into an island portion generally. Therefore, in order to attain the target sea island structure, it is necessary to take into consideration the above-mentioned melt viscosity and the balance of a presentation but, and in this invention, in order that that more than 20 capacity % uses matrix resin A which forms a sea section may form the sea island decentralized structure mentioned above, it is suitable. In order for the diameter of an average domain of an island portion to be less than 3.5 micrometers so that it may mention later, it is desirable to use the engineering plastics B by 20 thru/or 50 capacity %, and to use matrix resin A in the range of 50 thru/or 80 capacity %.

[0039]

In this invention, as for the sea section formed of matrix resin A, below 80 area % needs for below 70 area % to carry out preferably. That is, since the island portion formed with the engineering plastics B will decrease if such a sea section exists so much more than needed, the characteristic of the engineering plastics B, such as gas barrier property, is no longer demonstrated fully.

[0040]

Especially the island portion formed with the engineering plastics B in this invention is a following formula (1) most suitably, although it is preferred that the range which is 0.3 thru/or

30 micrometers has 0.1 thru/or 50 micrometers of averages of the major axis.

$$R = \frac{\sum_{i=1}^n r_i}{n} \quad (1)$$

1

r_i shows the diameter of a domain, n shows the number of domains, and diameter of domain r_i . However, minor-axis a_i of a domain, . Express with $r_i = (a_i + b_i) / 2$ as major-axis b_i of a domain.

It is desirable, when that particle diameter control is carried out fully demonstrates the characteristic of the engineering plastics B, such as gas barrier property, and it secures transparency etc. so that it may come out and the diameter of an average domain expressed may be set to less than 3.5 micrometers. When the particle diameter of an island portion is not much large, there is a possibility that functions and mechanical strengths, such as gas barrier property, may fall.

[0041]

Such particle diameter control The mixing ratio of the resin A and the engineering plastics B, When the engineering plastics B are the things containing an oxidizing organic component and a transition metal catalyst, it can carry out by adjusting mixing requirements, such as melt viscosity for the presentation of the loadings of the oxidizing organic component in the engineering plastics B, etc., and melting mixing, mixing time, a shear rate, and melting temperature.

For example, the mixing ratio of the resin A and the engineering plastics B is a rate of a volume ratio, as mentioned above, A: When it is preferred that it is in the range of B= 80:20 thru/or 50:50 and it uses polyene system polymers, such as maleic anhydride denaturation polybutadiene, as an oxidation organic component, It is suitable when acquiring the particle diameter and particle size distribution which blending an oxidizing organic component at 0.1 thru/or 10% of the weight of a rate mentioned above.

[0042]

In the interlayer 2 who has the sea island decentralized structure mentioned above, In the range which does not spoil the sea island decentralized structure or moldability, lubricant, such as various combination drugs, for example, a bulking agent, colorant, heat-resistant stabilizer, weathering stabilizer, an antioxidant, an antiaging agent, light stabilizer, an ultraviolet ray absorbent, a spray for preventing static electricity, metallic soap, and a wax, resin for refining, or rubber can also be blended.

[0043]

[Lamination] etc.

Typically, although the multilayer-structure object for a package in this invention has lamination as shown in drawing 1, Of course, as long as not the thing limited to such lamination but the

interlayer 2 who has the sea island decentralized structure mentioned above adjoins the inside-and-outside layers 1a and 1b directly, without passing a layer with an exceptional adhesives layer etc., For example, the inside-and-outside layers 1a and 1b, a resin layer of the same kind, the scrap layer that consists of scrap resin by which it was generated at the process of fabricating a container etc., etc. can also be provided among the inside-and-outside layers 1a and 1b, and, of course, it is also possible to form the two or more layers interlayer 2 who has the sea island decentralized structure mentioned above.

[0044]

Although there is no restriction in the thickness of each class which constitutes the multilayer-structure object for a package of this invention, generally the thickness of the inner layer 1a or the outer layer 1b is good for especially the thickness especially of 250 thru/or 500 micrometers and the interlayer 2 to be [10 thru/or 1000-micrometer] 1 thru/or 300 micrometers in the range of 3 thru/or 50 micrometers.

[0045]

[Use]

The multilayer-structure object for a package of this invention can take the form of middle molded products, such as a film, a sheet, a bottle, parison for tube formation or a pipe, a bottle, or preforming for tube formation, and via such a middle molded product, Eventually, use is presented as packing materials, such as a cup, a tray, a bottle, a tube vessel, a pouch, and a container lid.

[0046]

using the extrusion machine and catapult of the number according to the number of layers -- extrusion molding publicly known in itself -- injection molding can be carried out, compression molding etc. can be performed as occasion demands, and a middle molded product can be fabricated. In this case, since the multilayer-structure object for a package of this invention does not have an adhesives layer at all, there may be few the extrusion machines and catapults to be used and it is advantageous in respect of a production cost etc. [of the number]

The film which is a middle molded product is used as a biaxially oriented film by carrying out biaxial stretching as occasion demands.

Shaping of the bottle from parison, a pipe, or preforming can be easily performed by carrying out the pinch-off of the extrusion thing with the split mold of a couple, and blowing a fluid into the inside.

After cooling a pipe or preforming, heat to extension temperature and it extends to shaft orientations, and an extension blow bottle etc. are obtained by carrying out blow extension by hydrostatic pressure in a hoop direction.

Containers, such as cup shape and tray shape, and a container lid are obtained by giving a

film thru/or a sheet to vacuum forming, pressure forming, bulging, plug assist forming, etc. A film can be used as a packaging bag (pouch) of various gestalten, and the bag manufacture can be performed by a publicly known method in itself.

[0047]

Especially the multilayer-structure object for a package of this invention is very useful as a container which prevents the flavor fall of the contents by oxygen.

For example, drinks, such as beer, wine, fruit juice, and carbonic acid soft drink, It is applied to the container for being filled up with various contents which produce degradation in existence of oxygen, such as fruit, nuts, vegetables, processed meat, small-child foodstuffs, coffee, jam, mayonnaise, catsup, cooking oil, a dressing, sauce, food boiled down in soy, dairy products, other drugs, cosmetics, and gasoline.

Since it excels also in transparency, the multilayer-structure object for a package of this invention can be used conveniently also for the container in which transparency is demanded.

[0048]

[Example]

This invention is not regulated by these examples although the following example explains this invention further.

[0049]

[Phase structure by an electron microscope, and adhesive evaluation]

From the multilayer film and the Multi-layer bottle, a test piece 2 mm in width and 30 mm in length was cut down, and it carried out after displaying a test piece section face-out in ultramicrotome, Pt vacuum evaporation was carried out at 10 mA for 60 seconds in the vacuum, and it pretreated. The test piece section which was 3 kV in accelerating voltage and pretreated it with the scanning electron microscope (JMS-6300F: made by JEOL Co., Ltd.) was observed, and the surface ratio (%) of phase structure and a domain was evaluated.

Next, existence of interlaminar peeling when the edge of a cutter is stood between that an interface is not checked by an inside-and-outside layer and the interlayer matrix (existence of an interface) and an inside-and-outside layer, and an interlayer was made into the judgment index, and the adhesive property in the wrapping material was evaluated.

[0050]

[Oxygen transmission quantity measurement of a multilayer film]

in Examples 1 thru/or 7 and the comparative examples 1 and 7 -- with a content volume of 80 ml oxygen impermeable cup like container [-- high RETOFU REXX:HR -- to 78-84 Toyo Seikan Kaisha, Ltd. make and polypropylene / steel foil /] made from polypropylene. Polypropylene was laminated in the multilayer film obtained, respectively, and it heat sealed under a nitrogen atmosphere by making this into a cover material.

Period storage of this cup like container was carried out for seven days at 22 **, and the

oxygen density in a cup like container was measured using the small high-speed gas chromatograph (M200: Japanese Tie Run). Oxygen transmission quantity was calculated from this oxygen density.

[0051]

[Underwater dissolved oxygen density measurement of a Multi-layer bottle]

Carrying out the flow of the nitrogen gas into the Multi-layer bottle which produced and prepared anoxia water in Examples 8 thru/or 10 and the comparative examples 8 and 9 with the anoxia water manufacture machine (LOW DISSOLVED OXYGEN: made by MIURA CO., LTD.). Full injection restoration of the anoxia water was carried out so that air bubbles might not mix, and it sealed with the cap made from aluminum. The dissolved oxygen concentration in a Multi-layer bottle inner drainage when it was kept for two weeks to 22 **60% of air-conditioned room was measured with the underwater dissolved-oxygen-concentration plan (oxygen indicator:orbispherelaoratori es).

[0052]

[Measurement of melt viscosity]

Melt viscosity was measured for measurement temperature [of 270 **], and resin temperature stable waiting time 5 minutes using the melt viscosity measuring device (CAPIROGRAPH 1B: made in Oriental Energy Machine factory) with the capillary tube length of 10 mm, and the diameter of a capillary tube of 1.0 mm. In the range of 100 to 1000 sec of shear-rates⁻¹, the melt viscosity of two sorts of resin to blend was measured.

[0053]

[Measurement of the diameter of an average domain, and the number of domains]

The total number of domains in the above-mentioned photograph is counted using the photograph of the sea island phase structure of the multilayer film or bottle (neck ring lower part thru/or preforming) whose magnification observed with the scanning electron microscope (JMS-6300F: made by JEOL Co., Ltd.) is 3000. Furthermore, paying attention to the pars insularis, the longest diameter and shortest diameter of each domain were measured, and it asked for the parameter Q with which the distribution width of the diameter of an average domain and the diameter of a domain is expressed from (1) and (2) types.

[0054]

[Measurement of Hayes]

The bottle was cut down so that interlaminar peeling might not happen a test piece 40 mm in width, and 30 mm in length from a shoulder, and the multilayer film extended to 3x3 also cut down a test piece 40 mm in width, and 30 mm in length. HAZE (%) was measured for the above-mentioned test piece by S&M COLOUR COMPUTER MODEL SM-4 (made by Suga Test Instruments Co., Ltd.).

[0055]

[Example 1]

As the engineering plastics B, a polymetaxylylene adipamide (MXD6) resin pellet [6121:Mitsubishi Gas Chemical Co., Inc. make] is used, The polyethylene terephthalate (PET) resin [RT543C:Japan Uni-Pet make] which used the lab PURASUTO mill [made in Oriental Energy Machine factory], and performed the 150 °C-4h drying process to the extrusion machine for inside-and-outside layers, The dry blend thing of the weight ratio 50:50 of polyethylene terephthalate resin [RT543C:Japan Uni-Pet make] of the above-mentioned engineering plastics B and the resin A which performed the 150 °C-4h drying process is used for the extrusion machine for interlayers, The two-sort 3 layered films of 100 micrometers of each class were produced with the molding temperature of 270 °C. The phase structure by electron microscope observation of this multilayer film section was observed, and the existence of interlaminar peeling was evaluated.

It heat sealed by having made the above-mentioned polypropylene sheet into the heat seal layer, using this as a cover material, the oxygen transmission quantity in eye of 22 cc [seven days] was measured, and oxygen barrier property was evaluated.

Melt viscosity was measured about two kinds of resin used for the above-mentioned dry blend.

[0056]

[Example 2]

As the engineering plastics B, the ethylene-vinylalcohol copolymer (EVOH) [EP-F101B:Kuraray Co., Ltd. make] whose ethylene content is 32-mol % is used, Production of two-sort 3 layered films and a cover material, electron microscope observation, evaluation of barrier nature, and measurement of melt viscosity were performed like Example 1 except having used the weight ratio with the resin A as the dry blend thing of 30:70.

[0057]

[Example 3]

As the engineering plastics B, Make 400 ppm of neo decanoic acid cobalt [DICANATE5000:Dainippon Ink & Chemicals, Inc. make] adhere to a polymetaxylylene adipamide (MXD6) resin pellet [6007:Mitsubishi Gas Chemical Co., Inc. make] in a cobalt equivalent unit, and melt kneading is carried out with a biaxial extruder, Production of measurement of melt viscosity, two-sort 3 layered films, and a cover material, electron microscope observation, and evaluation of barrier nature were performed like Example 1 except having created the oxygen uptake nature resin composition pellet.

[0058]

[Example 4]

As the engineering plastics B, the terminal amino group concentration immediately after water-vaporproofing-packaging opening uses as a substrate polymetaxylylene adipamide resin [T-

600:Toyobo Co., Ltd. make] which is 87 eq(s)/106g, Liquefied maleic anhydride denaturation polybutadiene [product made from M-2000-20:Nippon Oil Chemicals] 5 % of the weight, The oxygen uptake nature resin composition which contains 350 ppm of neo decanoic acid cobalt [DICNATE5000:Dainippon Ink & Chemicals, Inc. make] by metal conversion is kneaded, Production of two-sort 3 layered films and a cover material, electron microscope observation, evaluation of barrier nature, and measurement of melt viscosity were performed like Example 1 except having created the oxygen uptake nature resin composition pellet.

In this example, others were asked for the diameter of an average domain, and the parameter Q from the electron microscope photograph.

Subsequently, biaxial extension of the above-mentioned two-sort three-layer multilayer film was carried out by 105 ** stretching speed 20 m/min 3 times as much length and horizontally [3 times as many] with the biaxial drawing machine [made in Oriental Energy Machine factory], and HAZE of the multilayer film was measured.

and, the one side -- adhesives -- {-- TM-280[Oriental Morton:] CAT-RT3 [made in Oriental Morton]: -- via mixed solution} of ethyl acetate (68.0:6.1:62.6). The 50-micrometer-thick polypropylene sheet [TOREFAN NO:Toray Plastic Films Co., Ltd. make] was laminated, this was made into the cover material, it heat sealed by having made the above-mentioned polypropylene sheet into the heat seal layer, the oxygen transmission quantity in eye of 22 ** [seven days] was measured, and oxygen barrier property was evaluated.

[0059]

[Example 5]

Except that the weight ratio of the engineering plastics B and the resin A used the dry blend thing of 40:60 for the interlayer, calculation of production of measurement of melt viscosity, two-sort 3 layered films, and a cover material, measurement of HAZE, electron microscope observation, the diameter of an average domain, and the parameter Q and evaluation of barrier nature were performed like Example 4.

[0060]

[Example 6]

Except that the weight ratio of the engineering plastics B and the resin A used the dry blend thing of 30:70 for the interlayer, calculation of production of measurement of melt viscosity, two-sort 3 layered films, and a cover material, measurement of HAZE, electron microscope observation, the diameter of an average domain, and the parameter Q and evaluation of barrier nature were performed like Example 4.

[0061]

[Example 7]

Except that the weight ratio of the engineering plastics B and the resin A used the dry blend thing of 20:80 for the interlayer, calculation of production of measurement of melt viscosity,

two-sort 3 layered films, and a cover material, measurement of HAZE, electron microscope observation, the diameter of an average domain, and the parameter Q and evaluation of barrier nature were performed like Example 4.

[0062]

[Example 8]

The coinjection-molding machine provided with three sets of the catapults of the catapult for the catapult (b) functionality interlayers for catapult (a) interlayer PET for inside-and-outside layer PET (c) is used, The polyethylene terephthalate [RT543C:Japan Uni-Pet make] which performed the 150 °C-4h drying process, and the dry blend thing which comprises the engineering plastics B used for c with the extrusion machine for interlayers of Example 4 and the resin A are supplied to a and b, The inside-and-outside layer and the interlayer did injection molding of a PET layer, and the two-sort multilayer preform of five layers between [whose] them is a functional interlayer one by one. The functional interlayer made 26.5 g of preforming weight among those 3 % of the weight. After having carried out biaxial stretching blow molding of the obtained preforming, creating a two-sort five-layer Multi-layer bottle and saving at 22 °C and 60% after anoxia water restoration on the 14th, the underwater dissolved oxygen concentration in a container was measured. Electron microscope observation of the Multi-layer bottle preforming section was performed, and it asked for the diameter of an average domain, and the parameter Q. HAZE of the bottle shoulder part was measured.

[0063]

[Example 9]

Except that the weight ratio of the engineering plastics B and the resin A used the dry blend thing of 40:60 for the interlayer, after saving at 22 °C and 60% after anoxia water restoration like Example 8 at a Multi-layer bottle on the 14th, the underwater dissolved oxygen concentration in a container was measured. Electron microscope observation of the Multi-layer bottle preforming section was performed like Example 8, and it asked for the diameter of an average domain, and the parameter Q. HAZE of the bottle shoulder part was measured.

[0064]

[Example 10]

Except that the weight ratio of the engineering plastics B and the resin A used the dry blend thing of 30:70 for the interlayer, after saving at 22 °C and 60% after anoxia water restoration like Example 8 at a Multi-layer bottle on the 14th, the underwater dissolved oxygen concentration in a container was measured. Electron microscope observation of the Multi-layer bottle preforming section was performed like Example 8, and it asked for the diameter of an average domain, and the parameter Q. HAZE of the bottle shoulder part was measured.

[0065]

[Comparative example 1]

Production of two-sort 3 layered films and a cover material, electron microscope observation, and evaluation of barrier nature were performed like Example 1 except having used only PET for the interlayer.

In this comparative example, since the resin A and the engineering plastics B were all PETs, measurement of melt viscosity was not performed.

[0066]

[Comparative example 2]

They are polyethylene (PE) [SUMIKASEN L705,] by Sumitomo Chemical Co., Ltd., and polyethylene-terephthalate-resin [RT543C to an interlayer. : Except having used the dry blend thing of the weight ratio 50:50 of] by Japan Uni-Pet, Measurement of melt viscosity, two-sort 3 layered films, and a cover material were produced like Example 1, and interlaminar peeling was evaluated.

[0067]

[Comparative example 3]

Except having used polypropylene (PP) [Novak PP FG3D and the dry blend thing of the weight ratio 50:50 of Japan Polychem] and polyethylene terephthalate resin (RT543C: made by Japanese Uni-Pet) for the interlayer, like Example 1 Measurement of melt viscosity, Two-sort 3 layered films and a cover material were produced, and interlaminar peeling was evaluated.

[0068]

[Comparative example 4]

It is polymetaxylylene adipamide (MXD6) resin pellet [T-600 to an interlayer. :] by Japanese Uni-Pet, and polyethylene-terephthalate-resin [RT543C Except having used the dry blend thing of the weight ratio 50:50 of] by : Japan Uni-Pet, Measurement of melt viscosity, two-sort 3 layered films, and a cover material were produced like Example 1, and interlaminar peeling was evaluated.

[0069]

[Comparative example 5]

Polyethylene (PE) [SUMIKASEN L705 and] by Sumitomo Chemical Co., Ltd. were used for the inside-and-outside layer, except the extrusion machine temperature for inside-and-outside layers having been 230 **, measurement of melt viscosity, two-sort 3 layered films, and a cover material were produced like Example 4, and interlaminar peeling was evaluated.

[0070]

[Comparative example 6]

Polypropylene (PP) [Novak PP FG3D and Japan Polychem] were used for the inside-and-outside layer, except the extrusion machine temperature for inside-and-outside layers having been 230 **, measurement of melt viscosity, two-sort 3 layered films, and a cover material were produced like Example 4, and interlaminar peeling was evaluated.

[0071]

[Comparative example 7]

Except that the weight ratio of the engineering plastics B and the resin A used the dry blend thing of 10:90 for the interlayer, calculation of production of measurement of melt viscosity, two-sort 3 layered films, and a cover material, measurement of HAZE, electron microscope observation, the diameter of an average domain, and the parameter Q and evaluation of barrier nature were performed like Example 4.

[0072]

[Comparative example 8]

Except using the dry blend thing of the weight ratio 50:50 of a polymetaxylylene adipamide (MXD6) resin pellet (T-600: made by Japanese Uni-Pet), and polyethylene terephthalate resin (RT543C: made by Japanese Uni-Pet) for the catapult for barrier layers, Electron microscope observation of the bottle preforming section was performed like Example 8, and the existence of the interface of an inside-and-outside layer and an interlayer matrix was checked.

In this comparative example, since an interface was checked by an inside-and-outside layer and the interlayer matrix by the above-mentioned electron microscope observation and it was clear that there is no adhesive property, calculation of measurement of the underwater dissolved oxygen concentration in a container, the diameter of an average domain, and the parameter Q and measurement of HAZE of a bottle shoulder part were made unnecessary.

[0073]

[Comparative example 9]

Except that the weight ratio of the engineering plastics B and the resin A used the dry blend thing of 60:40 for the interlayer, after saving at 22 ** and 60% after anoxia water restoration like Example 8 at a Multi-layer bottle on the 14th, the underwater dissolved oxygen concentration in a container was measured. Electron microscope observation of the Multi-layer bottle preforming section was performed like Example 8, and it asked for the diameter of an average domain, and the parameter Q. HAZE of the bottle shoulder part was measured.

[0074]

[Table 1]

	内外層	海部分の樹脂 (樹脂A)	海部分の組成 (面積%)	島部分の樹脂 (樹脂B) 注1)	容器形状	包材での 接着性	酸素透過量 (cc/day/m ²)	水中溶存 酸素量 (ppb: 22°C、 2週間)	粘度	平均ドメ イン径 (μm)	バロメー ターQ	HAZE
実施例1	PET	PET	43	MXD6	フィルム	○	51.5	—	A<B	—	—	—
実施例2	PET	PET	66	EVOH	フィルム	○	45.0	—	A>B	—	—	—
実施例3	PET	PET	43	MXD6/Co	フィルム	○	40.5	—	A<B	—	—	—
実施例4	PET	PET	42	MXD6/MA-Pbd/Co	フィルム	○	21	—	A<B	3.2	0.71	18.4
実施例5	PET	PET	54	MXD6/MA-Pbd/Co	フィルム	○	32.0	—	A<B	2.4	0.68	19.8
実施例6	PET	PET	68	MXD6/MA-Pbd/Co	フィルム	○	46.8	—	A<B	1.3	0.85	10.9
実施例7	PET	PET	77	MXD6/MA-Pbd/Co	フィルム	○	62.7	—	A<B	1.03	0.80	12.9
実施例8	PET	PET	32	MXD6/MA-Pbd/Co	ボトル	○	—	377	A<B	1.6	0.69	18.2
実施例9	PET	PET	42	MXD6/MA-Pbd/Co	ボトル	○	—	239	A<B	1.6	0.74	15.3
実施例10	PET	PET	51	MXD6/MA-Pbd/Co	ボトル	○	—	254	A<B	1.1	0.81	14.2
比較例1	PET	PET	100	PET	フィルム	○	99.3	—	—	—	—	—
比較例2	PET	PE	40	PET	フィルム	×	—	—	A<B	—	—	—
比較例3	PET	PP	41	PET	フィルム	×	—	—	A<B	—	—	—
比較例4	PET	MXD6	58	PET	フィルム	×	—	—	A>B	—	—	—
比較例5	PE	PET	42	MXD6/MA-Pbd/Co	フィルム	×	—	—	A<B	—	—	—
比較例6	PP	PET	42	MXD6/MA-Pbd/Co	フィルム	×	—	—	A<B	—	—	—
比較例7	PET	PET	83	MXD6/MA-Pbd/Co	フィルム	○	96.5	—	A<B	0.91	0.88	11.1
比較例8	PET	MXD6	58	PET	ボトル	×	—	—	A>B	—	—	—
比較例9	PET	PET	11	MXD6/MA-Pbd/Co	ボトル	○	—	346	A<B	4.3	0.58	31.2

注1) MA-Pbd: 無水マレイン酸変性ポリブタジエン

[0075]

[Effect of the Invention]

In this invention, it consists of a sea section (matrix) formed from the resin A which has an adhesive property in an inside-and-outside layer, and an island portion formed from the engineering plastics B, and a sea section makes the interlayer between inside-and-outside

layers the sea island structure which is below 80 area %.

Therefore, an interlayer can be taken as the multilayer-structure object for a package excellent also in functionality, such as gas barrier property which show the layer indirect arrival nature which was excellent without providing an exceptional adhesives layer between inside-and-outside layers, and the engineering plastics B have.

Transparency can also be raised by making or more into 0.68 distribution parameter Q expressed with less than 3.5 micrometers and the above-mentioned formula (2) in the diameter of an average domain expressed with the above-mentioned formula (1) of an island portion.

[Brief Description of the Drawings]

[Drawing 1] It is a figure showing the example of representation of the lamination of the multilayer-structure object for a package of this invention.

[Drawing 2] It is a figure showing the relation between distribution parameter Q and Hayes.

[Drawing 3] It is a figure showing the relation between distribution parameter Q and Hayes.

[Description of Notations]

1a: Inner layer

1b: Outer layer

2 : interlayer

A: Sea section (matrix)

B: Island portion

[Translation done.]